

What is claimed is:

1. A demodulation method for establishing synchronization from a received signal that contains a synchronization establishment signal wherein the change in amplitude periodically alternates between positive and negative, and demodulating said received signal,

5 the demodulation method comprising a step of establishing synchronization from said received signal based on the timing of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal, and demodulating said received signal.

2. A demodulation method according to claim 1, wherein
10 synchronization is established from a plurality of received signals for each received signal and each of said received signals is demodulated.

3. A synchronization establishment apparatus that establishes synchronization from a received signal that contains a synchronization establishment signal wherein the change in amplitude periodically alternates between positive and negative,

15 the synchronization establishment apparatus comprising:
positive/negative change timing detection means that detects the timing of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal, and

20 synchronization establishment means that establishes synchronization from said received signal based on the detected timing.

4. A modem that modulates transmitted signals, and also establishes synchronization from a received signal that contains a synchronization establishment signal wherein the change in amplitude periodically alternates between positive and negative, demodulates said received signal

25 the modem comprising:
modulating means that modulates transmitted signals,
positive/negative change timing detection means that detects the timing of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal,

30 synchronization establishment means that establishes synchronization from said received signal based on the detected timing, and

demodulation means that demodulates said received signal according to the established synchronization timing.

5. In a traffic information system wherein base stations and mobile stations
35 communicate wirelessly, a base station that modulates signals and wirelessly transmits same to the mobile stations, and also wirelessly receives from the mobile stations a signal that

contains a synchronization establishment signal wherein the change in amplitude periodically alternates between positive and negative, establishes synchronization from said received signal and demodulates said received signal

the base station comprising:

an antenna that transmits and receives wireless signals,

modulating means that modulates signals,

transmission means that wirelessly transmits modulated signals to the mobile stations via the antenna,

receiving means that receives via the antenna signals transmitted wirelessly from the mobile stations,

positive/negative change timing detection means that detects the timing of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal,

synchronization establishment means that establishes synchronization from said received signal based on the detected timing,

demodulation means that demodulates said received signal according to the established synchronization timing, and

control means that communicates the signals exchanged with the mobile station to external apparatus.

6. A synchronization establishment apparatus according to claim 3, wherein synchronization is established from a plurality of received signals for each received signal.

7. A modem according to claim 4, wherein synchronization is established from a plurality of received signals for each received signal and each of said received signals is demodulated.

8. A base station according to claim 5, wherein synchronization is established from a plurality of received signals for each received signal and each of said received signals is demodulated.

9. A demodulation method according to claim 1, wherein a preamble pattern wherein 1001 is repeated in $\pi/4$ -shift QPSK is used as the synchronization establishment signal, and a burst signal containing said preamble pattern is used as the received signal.

10. A synchronization establishment apparatus according to claim 3, wherein a preamble pattern wherein 1001 is repeated in $\pi/4$ -shift QPSK is used as the synchronization establishment signal, and

a burst signal containing said preamble pattern is used as the received signal.

11. A modem according to claim 4, wherein

a preamble pattern wherein 1001 is repeated in $\pi/4$ -shift QPSK is used as the synchronization establishment signal, and

5 a burst signal containing said preamble pattern is used as the received signal.

12. A base station according to claim 5, wherein

a preamble pattern wherein 1001 is repeated in $\pi/4$ -shift QPSK is used as the synchronization establishment signal, and

a burst signal containing said preamble pattern is used as the received signal.

10 13. A synchronization establishment apparatus according to claim 10, wherein the synchronization establishment apparatus comprises:

an amplitude difference detection circuit that uses an A/D converter to convert the received burst signal from an analog signal to a digital signal, squares the value of the converted digital signal, and outputs the temporal change of said squared value as a difference signal,

15 a low pass filter that takes the difference signal from the amplitude difference detection circuit, and filters and outputs the signal,

a polarity bit converter that outputs data of different values when the polarity of the output value from the low pass filter is positive than when negative,

20 a change point extraction circuit that, based on the output value from the polarity bit converter, extracts the timing at which the value of the waveform of the amplitude difference based on the squared value crosses the zero point,

a change point measurement circuit that averages the positive/negative change point timing of said extracted amplitude difference based on the squared value,

25 a clock synchronization establishment circuit that, based on the average value from the change point measurement circuit, establishes clock synchronization, and

a timing generation circuit that, based on the timing at which the received burst signal starts, determines the position to reset the clock.